

REMARKS

This Amendment responds to the Office Action dated March 17, 2006.

The Examiner rejected claims 2-8 under 35 U.S.C. § 112, second paragraph because the term "said object" lacked antecedent basis. Independent claim 40, from which each of claims 2-8 depend, has been amended to provide an antecedent for this term.

The Examiner rejected claims 2, 3, 12, 14, 15, 12, 18, 20, 21, 24, 25, 28, 34, and 40 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Ichihara et al., U.S. Patent No. 5,198,853 (hereinafter Ichihara) and Feng et al., U.S. Patent No. 6,046,828 (hereinafter Feng). The Examiner rejected claims 4-8 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Ichihara, Feng, and Yamanishi, U.S. Patent No. 5,696,595. The Examiner rejected claims 9-11, 13, 22, 23, 26, and 27 under 35 U.S.C. § 103(a) as being obvious in view of the combination of Ichihara, Feng, and Kowalski, U.S. Patent No. 5,778,104.

Independent claim 40, as amended, includes the limitation of "a variable luminance threshold value automatically calculated using one or more statistical measures and that causes detection of shadows cast by said object on said backing." This limitation is neither disclosed nor suggested by any of the cited references. Ichihara discloses a scanner that determines the size of a document by detecting edges of shadows cast on a cover by a document resting on a platen of the scanner. Ichihara's scanner illuminates the document and performs a scanning pass using a CCD sensor that outputs an image signal line, comprising pixel values. This signal is then subjected to a difference operator, which presumably filters the signal to show the change in pixel value relative to its immediate neighbor. Shadow edges are detected by comparing the difference value of each pixel to a pre-set threshold. Although the threshold of Ichihara is

disclosed to be manually adjustable by means of a ten-key numeric keypad, the threshold is not “automatically adjustable” and is not “calculated using one or more statistical measures.” Thus, Ichihara fails to disclose the limitation quoted above.

Nor does Feng disclose the limitation recited above, because Feng fails to disclose detecting the shadow of an image cast upon a backing. Instead, Feng discloses an edge detection mechanism for a document boundary that records luminance values sensed by each respective sensor pixel in a linear CCD array as a document is fed between the array and a backing material of a uniform luminance. More specifically, Feng discloses that, because the backing has a uniform luminance, the standard deviation of luminance values recorded by a pixel in the array that images the backing reflects only pixel noise, while the standard deviation of luminance values recorded by a pixel imaging a document also reflects, in addition to pixel noise, the luminance changes of the document itself. Hence, the methods used by Feng only detect the difference between the luminance of a backing and the luminance of a document. Furthermore, the methods of Feng are incapable of detecting the difference between the luminance of a backing and the luminance of a shadow cast by a document, because a shadow cast by a document, like the backing, would have a relatively uniform luminance, and the standard deviation of the shadow region would reflect only sensor noise. In other words, the methods of Feng could not distinguish the transition between a backing and a shadow cast on the backing because the standard deviation of the luminance values recorded by respective sensor pixels imaging the backing and a shadow on the backing, would each only reflect sensor noise. Thus, the statistical measure used by Feng, i.e. a standard deviation, etc., would be of no utility in the scanner of Ichihara.

In any event, Feng does not even disclose using statistical measures, such as the standard deviation, etc. to calculate a variable luminance threshold against which image pixels are compared to detect document (or shadow) edges. The Examiner cites column 6 lines 48-57 of Feng as disclosing the limitation of “a variable luminance threshold calculated using one or more statistical measures.” The Examiner, however, removes the context from this limitation. The cited passages of Feng disclose using two statistical measures, e.g. peak white and black luminance values, to calculate a threshold used “in determining whether a pixel is black or white, and whether the document covers the ends of the scanner.” (In this latter instance, the scanner would be unable to detect the boundaries of the document because those boundaries would not be scanned). The limitation in claim 40, however, specifies that the threshold calculated from one or more statistical measures “cause detection of shadows cast by said object.” Feng’s variable threshold not only fails to detect shadows, but also fails to detect any transition between the document and the backing; instead, it is used for a completely different purpose.

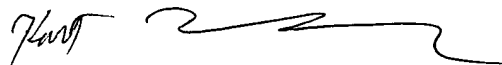
Accordingly, the combination of Ichihara and Feng does not suggest the limitation of “a variable luminance threshold value automatically calculated using one or more statistical measures and that causes detection of shadows cast by said object on said backing.” Therefore, independent claim 40 patentably distinguishes over the cited combination, and the Examiner’s rejection of this claim should be withdrawn. Furthermore, all of the Examiner’s rejections of the remaining claims are premised on the erroneous contention that the combination of Ichihara with Feng discloses the above-quoted limitation. Therefore, each of claims 2-15, 17, 18, 20-28, and 34, which depend from independent claim 40, are patentably distinguishable over the

respectively cited combinations for the same reasons as is independent claim 40, and the Examiner's rejection of these claims should also be withdrawn.

Finally, the applicant notes that the Examiner's respective rejections of several dependent claims are groundless. For example, dependent claim 24 recites the limitation that the threshold value varies with the size of the image. The Examiner cites col. 6 lines 52-56 of Feng as reciting this limitation, but the cited passage merely states that a calculated threshold can be used to determine whether a document is larger than the width of the scanner. It does not disclose that the calculated threshold vary with the size of the document being scanned. Similarly, Kowalski, U.S. Patent No. 5,778,104 does not suggest that either of Feng's or Ichihara's *thresholds* be "calculated based upon a percentage of the maximum observed statistical measure" as recited in claims 26 and 27. Instead, that reference merely discloses that a strength of a color smoothing *filter* may be based on the minimum and maximum luminance values in the neighborhood of a pixel to be filtered. This technique has absolutely no application in the respective boundary detection methods of Feng and Ichihara, which require no color information, and where neither threshold value is used to filter pixels of an imaged document.

In view of the foregoing amendments and remarks, the applicant respectfully requests reconsideration and allowance of claims 2-15, 17, 18, 20-28, 34 and 40.

Respectfully submitted,



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